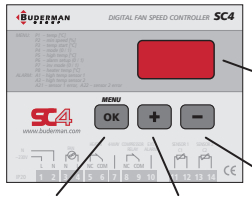
KEYBOARD



displays the current condensaton point at the place where the sensor is mounted, as well as the user's settings

setting and confirming parameters

changing parameters or increasing the value of a given parameter within a specific interval

changing parameters or decreasing the value of a given parameter within a specific interval

ALARMS

A11 (A11) **high temp**
high condensation point, turns off the compressor, at the instant the alarm occurs, contacts 8, 9, are opened and contacts 9, 10 are closed; the **alarm can be cancelled** by pressing any key (or turnning power off – see P6)

A21 (A21) **sensor error**
temperature sensor failure

TECHNICAL DATA

supply voltage	~230V
fan maximum current	3A
maximum feed current	
compressor crankcase heaters (terminals 5, 6)	4A
maximum feed current	
compressor contactor coils (terminals 8, 9, 12)	4A

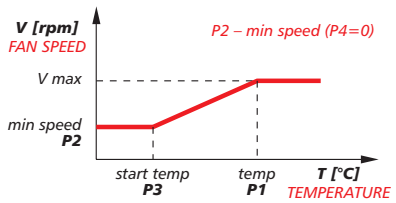
working temp. of the device: from -30°C to +70°C

the package includes:
SC4 controller (1); temperature sensor (2); self-adhesive insulation tape (1); terminal block (1); band clip (2); metal sheet screw (2)

factory settings and range of available settings:

P1 = 45°C	1 – 55°C (P1 > P3)
P2 = 20%	1 – 99 %
P3 = 30°C	1 – 54°C (P3 < P1)
P4 = 0	0 – min speed or 1 – start temp
P5 = 60°C	56 – 80°C
P6 = 0	0 or 1
P7 = 0	0 or 1
P8 = 4°C	0 – 10°C
P9 = 1 sek	0 – 10 sec.

GRAPHS OF OPERATING MODES (P4)



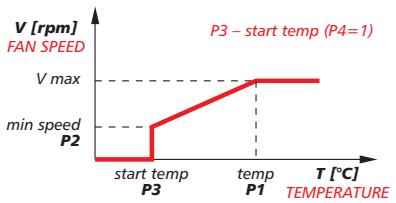


TABLE OF TEMPERATURE IN RELATION TO PRESSURE

temp.	[°C]	-20	-18	-16	-14	-12	-10	-8	-6	-4	-2	0	2	4	6
R22	[bar]	1.44	1.63	1.84	2.06	2.29	2.53	2.79	2.06	3.35	3.65	3.97	4.30	4.65	5.01
R407	[bar]	1.09	1.27	1.46	1.66	1.88	2.11	2.36	2.62	2.89	3.18	3.49	3.81	4.15	4.51
R410	[bar]	2.97	3.28	3.61	3.96	4.32	4.71	5.11	5.54	5.99	6.47	6.96	7.48	8.03	8.61

temp.	[°C]	8	10	12	14	16	18	20	22	24	26	28	30	32	34
R22	[bar]	5.40	5.80	6.22	6.66	7.11	7.59	8.09	8.61	9.15	9.71	10.29	10.90	11.53	12.19
R407	[bar]	4.89	5.29	5.71	6.15	6.61	7.09	7.59	8.12	8.68	9.25	9.86	10.49	11.15	11.80
R410	[bar]	9.21	9.84	10.50	11.18	11.90	12.66	13.44	14.26	15.11	16.00	16.92	17.89	18.89	19.93

temp.	[°C]	36	38	40	42	44	46	48	50	52	54	56	58	60	62
R22	[bar]	12.87	13.58	14.31	15.07	15.86	16.67	17.52	18.39	19.29	20.23	21.20	22.20	23.23	24.20
R407	[bar]	12.55	13.30	14.08	14.89	15.74	16.62	17.53	18.48	19.47	20.50	21.57	22.68	23.83	25.03
R410	[bar]	21.01	22.13	23.30	24.51	25.76	27.05	28.40	29.78	31.22	32.70	34.23	35.81	37.43	39.11

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BUDERMAN GROUP

DIGITAL FAN SPEED CONTROLLER SC4

operating manual
ver. 41.x

Before connecting and activating the device, please read these operating instructions and keep them for future reference

SC4 – NEW FUNCTIONS

NEW

The **SC4** controller has new very usefull functions:
- monitoring and visualisation **outdoor temperature**;
- **second sensor C2** (optional);
- **full heater control** (5, 6 contacts) on basis of the outdoor temperature;
- setting of **hard start** (0 – 10sec.), P9 parameter;
- changes of of the connection (see connection diagram).

HOW THE SC3 CONTROLLER WORKS

The **SC4** controller is adapted to work in devices requiring **smooth control of rotation speed of the fan motor** (or any other element connected to contacts 3 and 4) **on the basis of temperature measurements** (sensor C1 - contacts 11, 12). According to the entered parameters, the **SC4** controller increases or decreases the fan speed in order to maintain the required temperature measured by the sensor C1. If the measured temperature exceeds the temperature set by the user P3 (P3), fan speed will be increased - to maximum, if need be. If the measured temperature is still higher than the set temperature P1 (P1) and reaches the alarm limit set by the user P5 (P5) – then the power feed to the compressor contactor coil (or any other element connected to contacts 8 and 9) will be cut off. This is a failure condition and will be signalled by the alarm symbol A11 (A11) flashing on the display panel. Return to normal operating mode is possible after the alarm has been cancelled, by pressing any key (or turnning power off – see P6). If the measured temperature is lower than the P1 (P1), fan speed will be reduced – to minimum P3 (P3), if need be. The most common use of the **SC4** controller is to control the condenser fan motor in air conditioning, cooling and cooling-heating devices.

NEW

OPTION: If second sensor (C2 - contacts 13, 14) is connected, the **SC4** controller can control heater connected to contacts 5, 6. If the measured temperature exceeds the temperature set by the user P8 (P8), then the contacts 5, 6 are opened. To check outdoor temperature, press nad hold down – key.

CAUTION: This function will be work properlly, if **SC4** controller is allways connected to the 230V AC power supply.

CAUTION: If second sensor C2 is NOT connected (C2 - contacts 13, 14), **SC4** controller smooth controls of rotation speed of the fan motor and contacts 5, 6 are closed.

FUNCTIONS

The controller performs the following tasks:
- maintaining a constant condensation point
- extending the life cycle of the compressor
- **controlling and powering the compressor crankcase heater on basis of temperature measurements – sensor C2** NEW
- monitoring and visualisation of the current condensation point – with no need to connect pressure gauges
- smooth control of fan speed, with simultaneous compressor activation, or with compressor activation on reaching a previously set temperature (condensation point)
- preventing a high condensation point and displaying alarm conditions

INSTALLATION

In order to ensure correct operation of the **SC4** controller, you should:

- disconnect the factory-made power supply cables from the fan and connect them to contacts 3, 4 in the controller;
- connect the power supply and control cables in accordance with the description (below);
- mount the sensor on the fourth (sixth at the furthest – counting from the top - where the temp is constant) elbow of the condenser. The sensor must adhere to the elbow with its whole surface. Fasten the sensor with the band clips and insulate it with the insulation tape supplied with the controller.
- connect additional wire from 4WAY valve to contacts 7 (see description below),

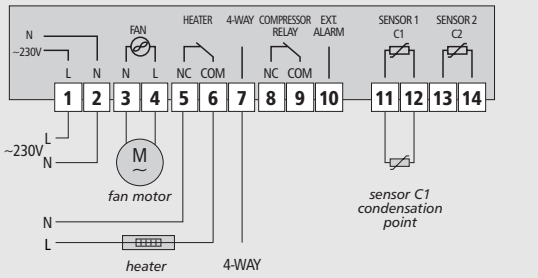
CAUTION: When the **SC4** controller is installed in a device that has a four-way valve (heat pump), the controlling signal should be connected from the **four-way valve** to terminal **no. 7**. On appearance of voltage (230V) from the 4-WAY valve, the controller is by-passed. Voltage is passed directly to the condenser fan motor.

CAUTION: CONTACT 1 IS CONNECTED TO CONTACT 2. NEW

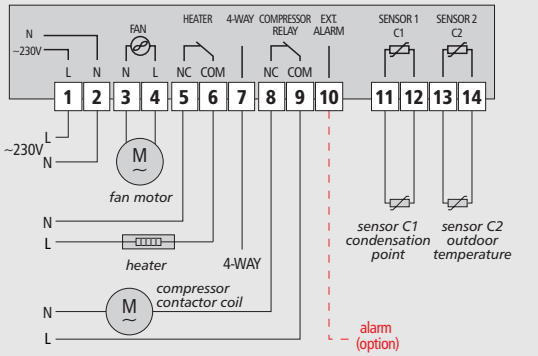
CAUTION: THE SC4 CONTROLLER MAY BE INSTALLED ONLY BY QUALIFIED PERSONNEL, WHO HAVE THE NECESSARY AUTHORISATION – REQUIRED BY THE REGULATIONS IN FORCE IN THE COUNTRY WHERE THE CONTROLLER IS BEING INSTALLED OR USED. BEFORE COMMENCING INSTALLATION, THE DEVICE ON WHICH THE CONTROLLER IS BEING INSTALLED MUST BE DISCONNECTED FROM THE POWER SUPPLY

CONNECTION DIAGRAM

VERSION 1



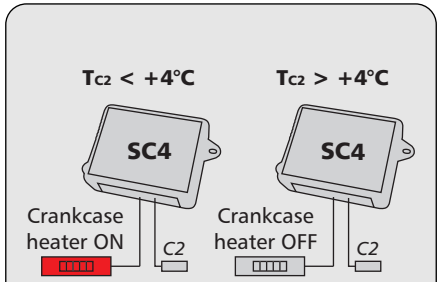
VERSION 2



terminal	description of the connection
1	SC4 controller power supply phase conductor
2	neutral conductor
3	neutral conductor feeding the fan motor
4	phase conductor feeding the fan motor
5	phase conductor feeding the compressor crankcase heater
6	phase conductor feeding the compressor crankcase heater
7	phase conductor from the 4-WAY valve
8	phase conductor feeding the contactor coil or compressor relay
9	phase conductor feeding the contactor coil or compressor relay
10	high condensation point alarm signalling
11,12	condensation point sensor plug
13,14	outdoor temperature sensor plug

CAUTION:
CONTACT 2 iS CONNECTED TO CONTACT 3

NEW



PROGRAMMING

After connecting the **SC4** controller to the 230V AC power supply, the currently measured temperature will be displayed on the display panel. In order to facilitate operation of the device, it has been equipped with a keyboard (3 keys) and a display panel.

Step 1 – parameter setting mode
Press OK. The symbol of the first parameter: P1 (P1).

Step 2 – selection of the parameter
Press +, to **select** a parameter (P1 – P9).

There are nine parameters to choose from:

- P1 (P1) **temp [°C]**
  setting the condensation point
- P2 (P2) **min speed [%]**
  minimum fan speed at power startup
- P3 (P3) **start temp [°C]**
  temperature at which fan is to start up
- P4 (P4) **mode**
  operating mode selection: min speed (0) or start temp (1)
- P5 (P5) **high temp**
  high temperature alarm threshold setting
- P6 (P6) **alarm setup**
  the alarm can be cancelled by pressing any key
  or turn off and on power supply
  (see table below)
- P7 (P7) **inv mode** NEW
  condition for heat pump mode
  (see table below)
- P8 (P8) **heater temperature**
  above this temperature heater is off
  (contacts 5, 6 are opened)
- P9 (P9) **hard start**
  duration of hard start
  (normally 1 sec, 0-10 sec)

Step 3 – changing parameter values
Press OK, then change the value using the + or − key. After setting the value, press OK, to save the new setting and return to the parameter symbol window.
Pressing and holding down + or − **will increase or reduce the values** being set.

Step 4 – switching to normal operating mode
Selection of the P1 (P1) parameter and pressing − will switch the controller to **normal operating mode**, ie. displaying the current measured temperature.
20 seconds after the last pressing of any key, the controller will **automatically return to normal operating mode**.

P6	cancel alarm A1	compressor	display
P6=0	press any key	on	current temp.
	turn off and on power SC4 **(alarm A1 can not be cancelled)**	**off**	alarm „A1"
P6=1	press any key	on	current temp.
	turn off and on power SC4	**on**	alarm „A1"

P7	contact 9	fan
P7=0	0V	smooth control of fan speed
	230V	maximum fan speed (heat pump)
P7=1	230V	smooth control of fan speed
	0V	maximum fan speed (heat pump)